

CLAIMS

What is claimed is:

1. A network interface controller, comprising:
 - a hashing logic to generate a hashing value from a packet received from a
 - 5 network, the received packet having a context associated therewith;
 - a hash table pages table and a context table pages table for storing host
 - memory physical page addresses of a host hash table and a host context table,
 - respectively; and
 - a cache line determinator in communication with the host and the hashing
 - 10 logic, the cache line determinator being configured to associate the hash value with a host
 - hash table cache line and a host context table cache line in a host memory using the hash
 - table pages table and the context table pages table, respectively.
2. The network interface controller of claim 1, wherein the hashing logic is
- configured to generate the hashing value from the context associated with the received
- 15 packet.
3. The network interface controller of claim 1, wherein each entry in the hash
- table pages table and the context table pages table correspond to a page in the host
- memory, the host memory being in communication with the network interface controller.

4. The network interface controller of claim 1, wherein the cache line determinator is configured to:

determine a hash node page and a context table page corresponding to the hash value;

5 lookup the physical address of the hash table page and the context table page from the hash table pages table and the context table pages table, respectively; and
determine the host hash cache line and the host context cache line using the physical address of the hash table page and the context table page and an offset of the hash value within the hash table page and the context table page, respectively.

10 5. The network interface controller of claim 1, wherein upon initialization, the network interface controller is configured with a set number of hash node entries in the hash table of the host memory.

6. The network interface controller of claim 1, wherein the network interface controller is configured to insert the host context table cache line and the host hash table
15 cache line into a receive descriptor associated with the received packet and to output the receive descriptor to the host.

7. The method of claim 1, further comprising:
issuing a pre-fetch of the host context table cache line and the host hash
table cache line.

8. A network interface controller, comprising:
- a hashing logic to generate a hashing value from a packet received from a network, the received packet having a context associated therewith;
- a cache line determinator in communication with the hashing logic, the
- 5 cache line determinator being configured to associate the hash value with a virtual host hash table cache line and a virtual host context table cache line in a memory of a host of the network interface controller, the network interface controller being configured to issue a pre-fetch of the host context table cache line and the host hash table cache lines to the host.
- 10 9. The network interface controller of claim 8, wherein the hashing logic is configured to generate the hashing value from the context associated with the received packet.
10. A method for processing incoming packets from a network, comprising:
- 15 hashing, by a network interface controller in communication with a host and a network, a packet received from the network, the packet having a context associated therewith to generate a hash value from context of the received packet;
- computing a host hash table cache line in a host memory using the hash value and using a hash table pages table containing host memory physical page addresses
- 20 of a host hash table; and

computing a host context table cache line in a host memory using the hash value and using a context table pages table containing host memory physical page addresses of a host context table.

11. The method of claim 10, wherein each entry in the hash table pages table
5 and each entry in the context table pages table correspond to a page in the host memory.

12. The method of claim 10, wherein computing the host hash table cache line includes:

determine a hash node page and a context table page corresponding to the hash value;

10 lookup the physical address of the hash table page and the context table page from the hash table pages table and the context table pages table, respectively; and

determine the host hash cache line and the host context cache line using the physical address of the hash table page and the context table page and an offset of the hash value within the hash table page and the context table page, respectively.

15 13. The method of claim 10, further comprising initializing the network interface controller, the initializing including configuring the network interface controller with a fixed number of hash node entries in the hash table of the host memory.

14. The method of claim 13, the initializing further comprising loading a hash table pages table and a context table pages table.

15. The method of claim 10, further comprising:
inserting the host context table cache line and the host hash table cache line
into a receive descriptor associated with the received packet; and
outputting the receive descriptor to the host.

5 16. The method of claim 10, further comprising:
issuing a pre-fetch of the host context table cache line and the host hash
table cache line.

17. A computer program product disposed on a computer readable medium to
process packets, the program including instructions for causing at least one processor to:
10 hash, by a network interface controller in communication with a host and
the network, a packet received from the network, the packet having a context associated
therewith to generate a hash value from context of the received packet;
compute a host hash table cache line in a host memory using the hash value
and using a hash table pages table containing host memory physical page addresses of a
15 host hash table; and
compute a host context table cache line in a host memory using the hash
value and using a context table pages table containing host memory physical page
addresses of a host context table.

18. The computer program product of claim 17, wherein the instruction for
20 causing at least one processor to compute the host hash table cache line includes
instructions for causing at least one processor to:

determining a hash node page corresponding to the hash value;
performing a lookup of the physical address of the hash table page from the
hash table pages table; and

determining the host hash cache line using the physical address of the hash
5 table page and an offset of the hash value within the hash table page.

19. The computer program product of claim 17, wherein the instruction for
causing at least one processor to compute the host context table cache line includes
instructions for causing at least one processor to:

determining a context table page corresponding to the hash value;
10 performing a lookup of the physical address of the context table page from
the context table pages table; and

determining the host context cache line using the physical address of the
context table page and an offset of the hash value within the context table page.

20. The computer program product of claim 17, further comprising the
15 instructions for causing at least one processor to:

insert the host context table cache line and the host hash table cache line into
a receive descriptor associated with the received packet; and
outputting the receive descriptor to the host.

21. The computer program product of claim 17, further comprising the instructions for causing at least one processor to:

issue a pre-fetch of the host context table cache line and the host hash table cache line.

5 22. A system, comprising:

a host CPU;

a host memory;

a network interface controller (NIC); and

a host bus to facilitate the host CPU, host memory, and the NIC to

10 communicate therebetween,

the NIC including:

a hashing logic to generate a hashing value from a packet received over a network, the received packet having a context associated therewith;

15 a hash table pages table and a context table pages table for storing host memory physical page addresses of a host hash table and a host context table, respectively, the host hash table and the host context tables being stored in the host memory; and

20 a cache line determinator in communication with the host bus and the hashing logic, the cache line determinator being configured to associate the hash value with a host hash table cache line and a host context table cache line in the host memory using the hash table pages table and the context table pages table, respectively.

23. The system of claim 22, wherein the host CPU is configured to issue a pre-fetch of the host context table cache line and the host hash table cache line.

24. The system of claim 22, wherein the hashing logic is configured to generate the hashing value from the context associated with the received packet.

5 25. The system of claim 22, wherein each entry in the hash table pages table and the context table pages table correspond to a page in the host memory, the host memory being in communication with the network interface controller.

26. The system of claim 22, wherein the cache line determinator is configured to
determine a hash node page corresponding to the hash value;
10 lookup the physical address of the hash table page from the hash table pages
table; and
determine the host hash cache line using the physical address of the hash
table page and an offset of the hash value within the hash table page.

27. The system of claim 22, wherein the cache line determinator is configured to
15 determine a context table page corresponding to the hash value;
lookup the physical address of the context table page from the context table
pages table; and
determine the host context cache line using the physical address of the
context table page and an offset of the hash value within the context table page.

28. The system of claim 22, wherein upon initialization, the network interface controller is configured with a set number of hash node entries in the hash table of the host memory.

29. The system of claim 22, wherein the network interface controller is
5 configured to insert the host context table cache line and the host hash table cache line into a receive descriptor associated with the received packet and to output the receive descriptor to the host.

30. The system of claim 22, wherein the network interface controller is
configured to issue a pre-fetch of the host context table cache line and the host hash table
10 cache line.